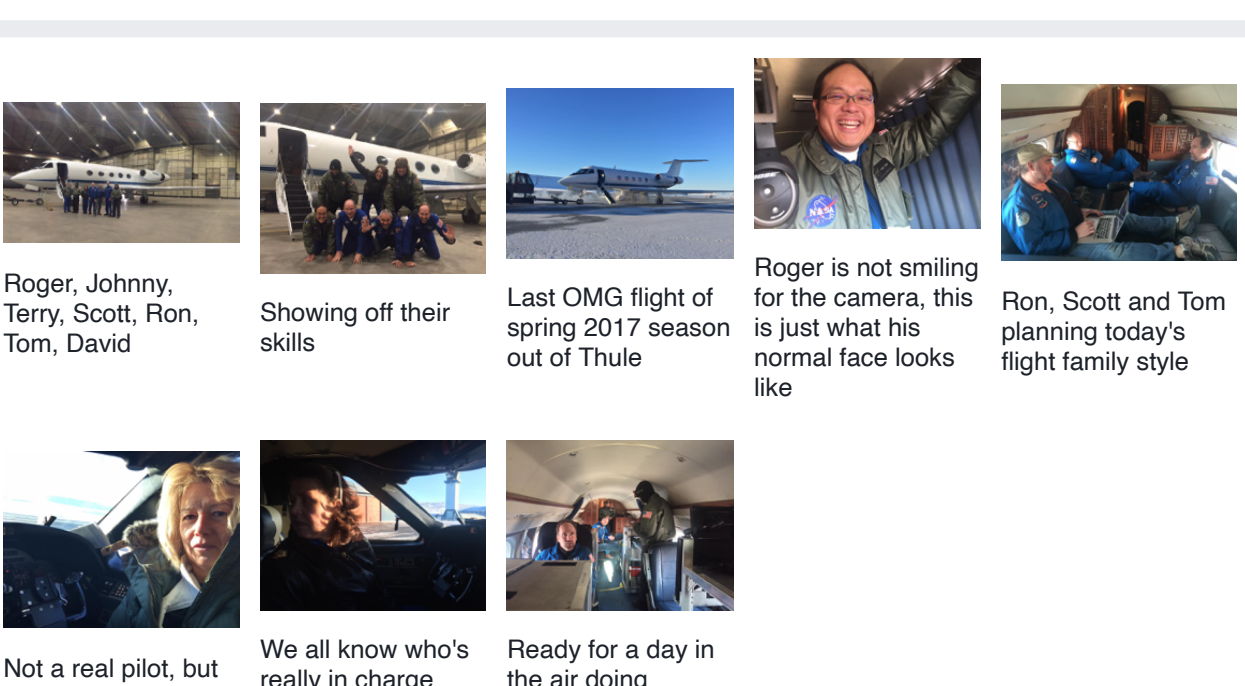
Oceans Melting Greenland (OMG) GLISTIN-A 2017 Campaign Field Report

Global sea level rise will be one of the major environmental challenges of the 21st Century. Oceans Melting Greenland (OMG) will pave the way for improved estimates of sea level rise by addressing the question: To what extent are the oceans melting Greenland's ice from below? Over a five-year campaign, OMG will observe changing water temperatures on the continental shelf surrounding Greenland, and how marine glaciers react to the presence of warm, salty Atlantic Water. The complicated geometry of the sea floor steers currents on the shelf and often determines whether Atlantic Water can reach into the long narrow fjords and interact with the coastal glaciers. Because knowledge of these pathways is a critical component of modeling the interaction between the oceans and ice sheet, OMG will facilitate improved measurements of the shape and depth of the sea floor in key regions as well.

The surveys of Greenland's ice sheet were conducted with the GLacier and Ice Surface Topography INterferometer (GLISTIN-A), which aims to produce high spatial resolution (25 m), high-precision (< 50 cm) height maps of Greenland's coastal glaciers, at 10 to12-km wide swaths using Ka-Band (8.4 mm wavelength) single-pass interferometry. By measuring ice surface elevation changes over several years, volume changes of marine terminating glaciers can be inferred. The GLISTIN-A radar is mounted in a pod under a Gulfstream III airplane. Operating at Ka-Band enhances interferometric accuracy, reduces penetration into the top layers of snow and firn and limits signal attenuation in the atmosphere.

The swaths generally cover the lower parts of the glaciers. The near edges of most swaths are set as close as possible to, and just downstream from, glacier fronts. The remainder of the swaths extend up-glacier from the fronts. Most swaths are flown across glacier flow, capturing as many glacier fronts as possible in each single swath. In the cases of a few large glaciers, swaths are flown along glacier flow, again extending from the front upstream towards the interior of the ice sheet.

This campaign was conducted by the GLISTIN-A Instrument Team aboard the Grumman Gulfstream III (G-III) aircraft. The data was collected during a survey of Greenland's ice sheet from March 6th to March 29th using the GLISTIN-A instrument. The entries of the field report that follow are in reverse chronological order.



Roger, Johnny, Terry, Scott, Ron, Tom, David

Showing off their skills

Last OMG flight of spring 2017 season out of Thule

Roger is not smiling for the camera, this is just what his normal face looks like

Ron, Scott and Tom planning today's flight family style

Not a real pilot, but plays one on TV

We all know who's really in charge here

Ready for a day in the air doing science

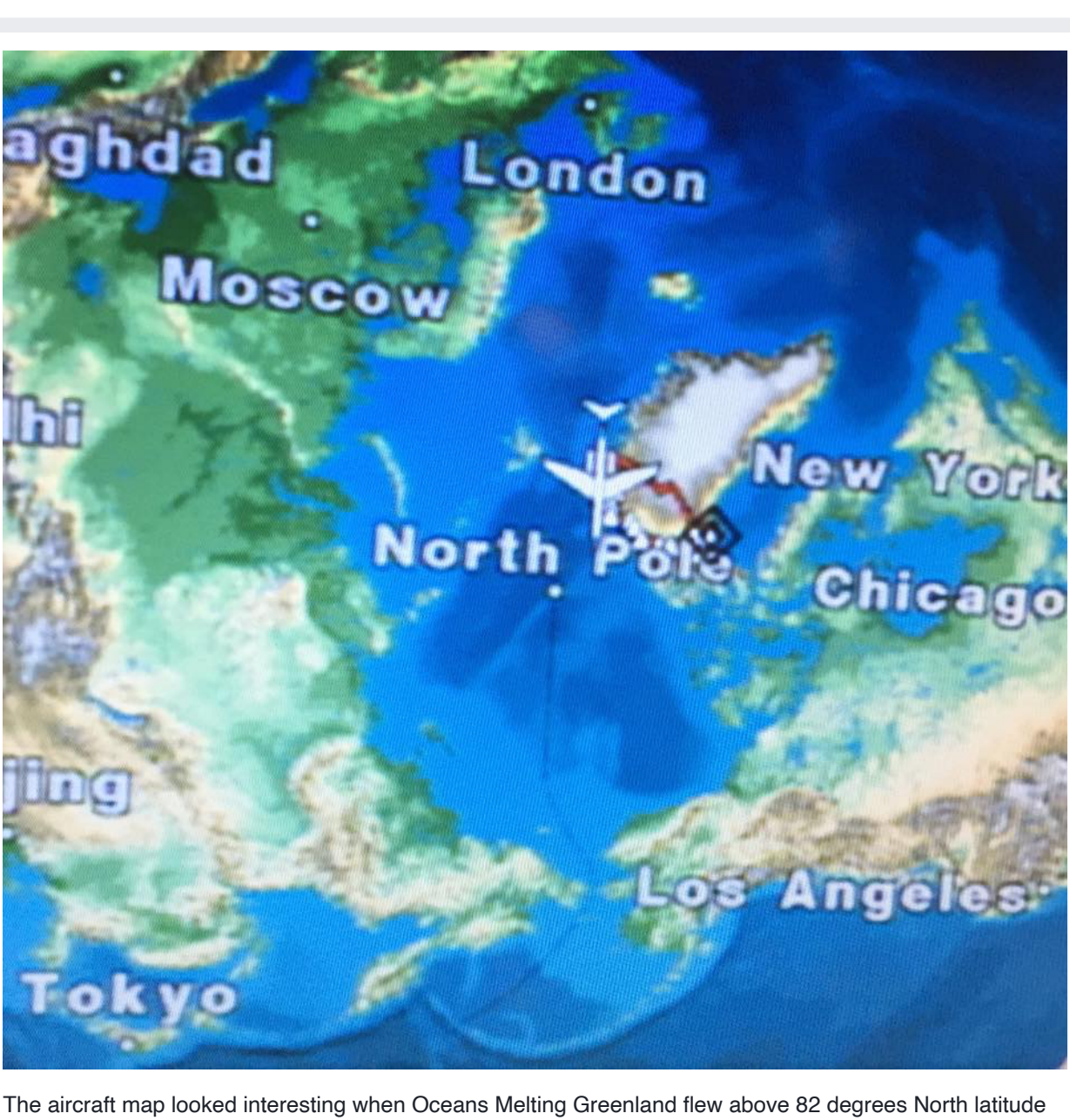
Mission Complete! OMG finished collecting all of the ice data planned for this year. Woohoo!!

Mar 23, 2017, 11:40 AM

Click for Video

#smoothasbutter
#smoothassilk
#didsomeonesaysmooth

Mar 22, 2017, 1:45 PM



The aircraft map looked interesting when Oceans Melting Greenland flew above 82 degrees North latitude to observe glaciers along the northernmost part of Greenland's coastline. Gives you a whole new perspective on planet Earth.

Mar 22, 2017, 11:11 AM

Click for Video

A cold morning on the runway at Thule Air Base in Greenland. Oceans Melting Greenland flying northeast today to survey more glaciers along the coast.

Mar 21, 2017, 4:02 AM

This is what a fjord and glacier look like from our Oceans Melting Greenland modified G-III plane. It's a remote area and there is still much to study about the ocean/ice interaction. You can see the ice sheet, which covers the interior of Greenland, at the top of the photo. The glacier has carved its way down through the terrain over thousands of years creating the fjord. At the bottom of the photo, you can see the surface of the ocean is frozen solid at the glacier's termination point even though today's the first day of spring. It's still very cold here, but the frozen sea surface, where the glacier empties into the ocean, will begin melting soon.

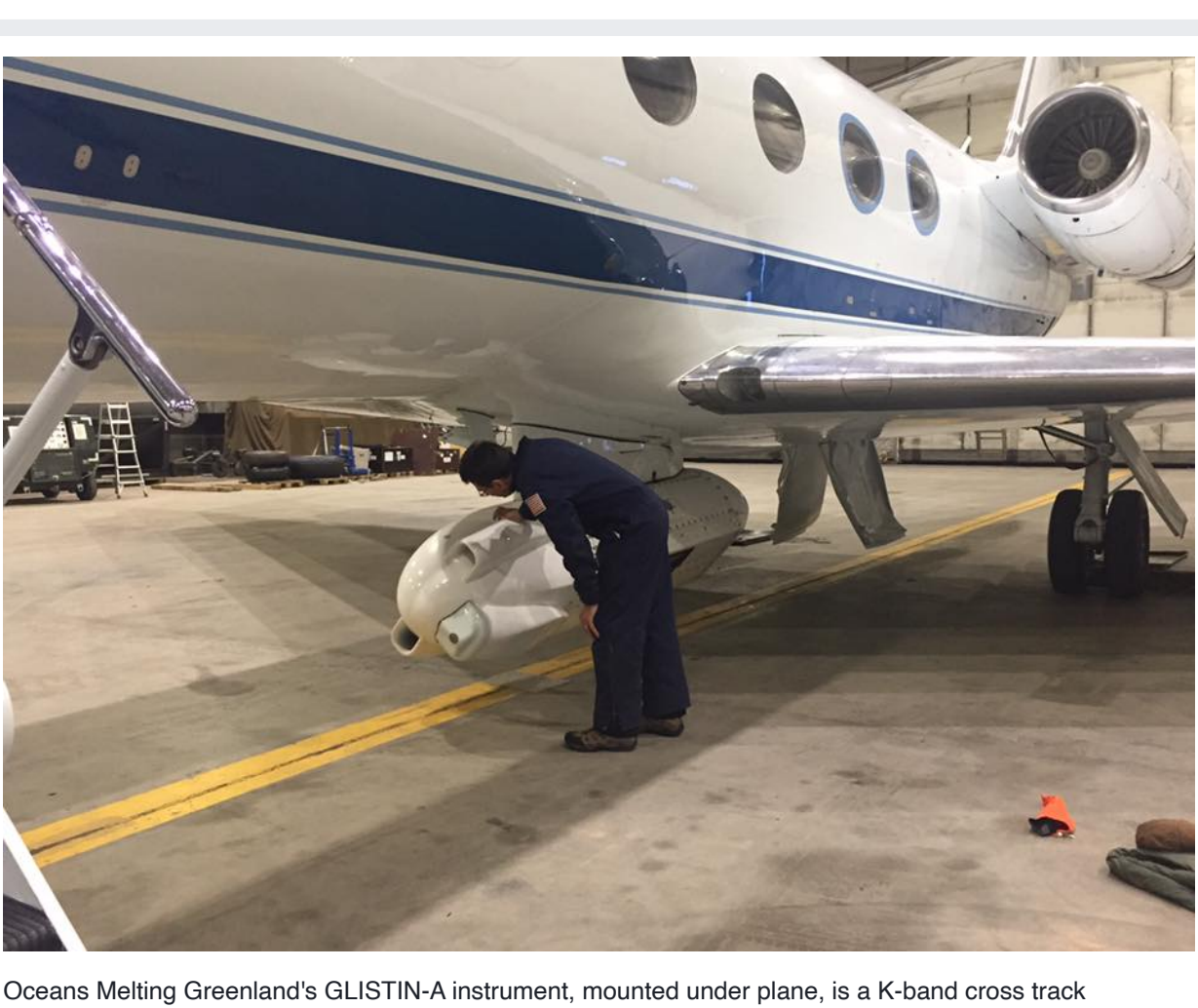
Mar 20, 2017, 2:21 PM

Laura Faye Tenenbaum joins Oceans Melting Greenland's flight today. "I'm psyched!'

Mar 20, 2017, 4:23 AM

Thule Air Base is grooming the runway because our NASA modified G-III is about to take off for a day of #Science.

Mar 20, 2017, 4:20 AM



Oceans Melting Greenland's GLISTIN-A instrument, mounted under plane, is a K-band cross track interferometer radar that is capable of measuring the height of the terrain in the radar swath. Today we're measuring glaciers.

Mar 20, 2017, 3:53 AM

Team OMG on our way to measure glaciers around Greenland's coastline.

Mar 20, 2017, 3:43 AM

This is an iceberg that was first formed as part of the Greenland ice sheet. Last summer or autumn it flowed into the Wolfsteinholme Fjord where it floated towards the ocean, but before it could get out to sea, the ocean surface froze and the iceberg got stuck. The fjord begins to freeze in October and the sea ice reaches a meter thickness. By May or June the sea ice, which covers the ocean surface, will melt and the berg will be set free with the others to flow out to sea and melt. Although sometimes the sea ice survives the summer. Places like this have almost no ocean data, but Oceans Melting Greenland is busy working to understand complex ocean processes that affect Greenland's coastline.

Mar 19, 2017, 6:18 PM

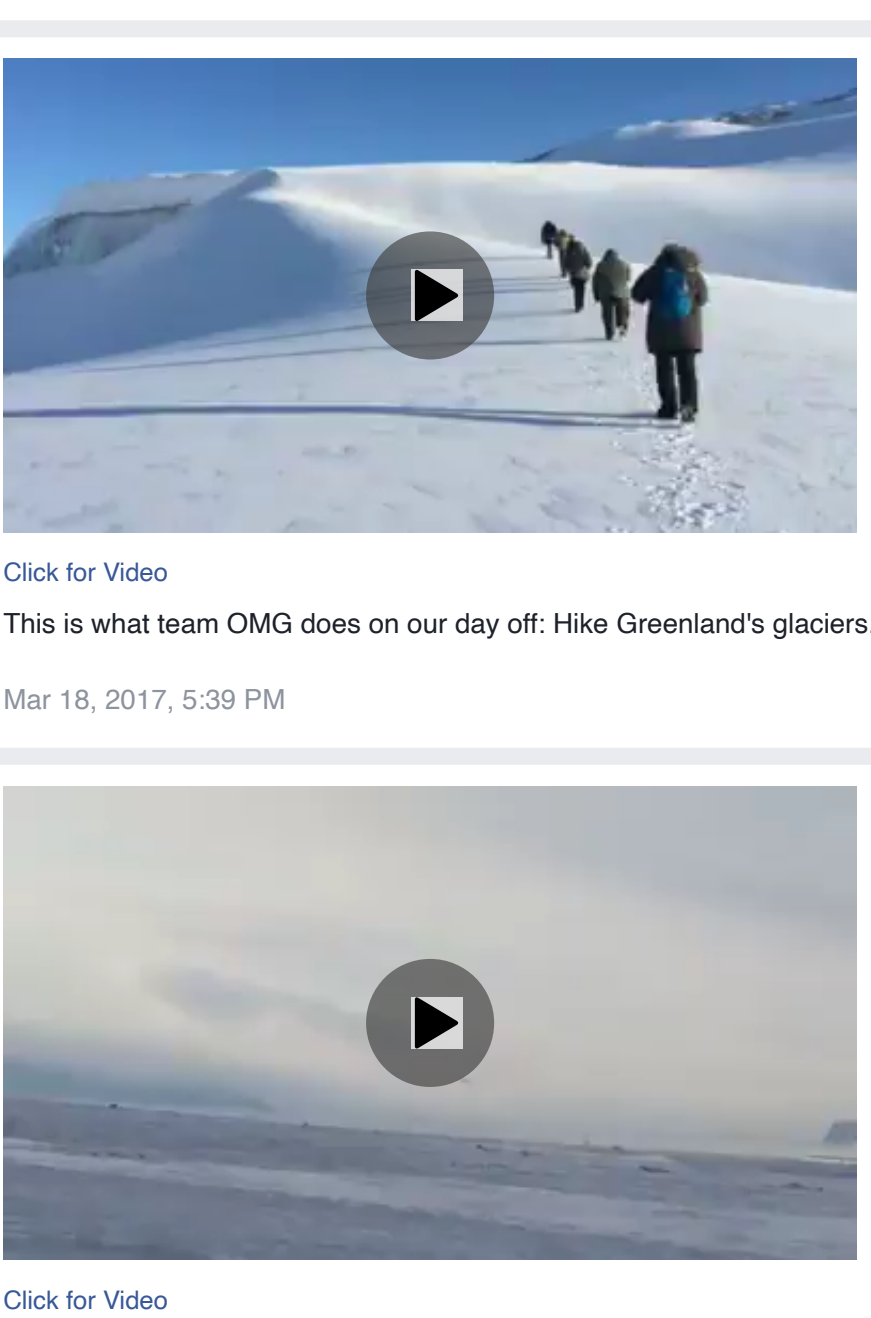
Over the last decade, NASA's twin GRACE satellites measured 2 trillion tons of ice melting from Greenland's ice sheet. Now the Oceans Melting Greenland team is back in the field for our second year to find out specifically how much ice is being lost due to warmer ocean waters around the coastline. This information will help us understand the amount of sea level rise we're going to have around the world. And BTW, isn't the Greenland Ice Sheet stunningly beautiful? With Laura Faye Tenenbaum

Place: Thule Air Base (76.531111111111, -68.703055555556)
Address: 3970 Pituffik, Thule, Vestgronland, Greenland

Mar 19, 2017, 5:50 AM

Thanks everyone, for following our progress on OMG during this deployment. Yesterday, Laura Faye Tenenbaum joined the crew and is now sharing all these really great photos and videos. I won't be joining the flights myself this spring but thanks to Laura Faye for all the excellent posts!

Mar 18, 2017, 7:48 PM



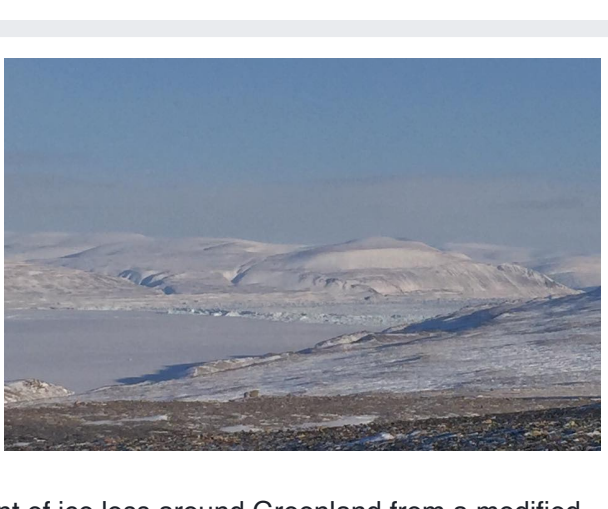
Click for Video

NASA G-III with Oceans Melting Greenland team aboard landing in Thule, Greenland.

Mar 18, 2017, 2:58 PM

Oceans Melting Greenland's modified NASA G-III aircraft landed safely at Thule Air Base after a successful day of collecting data on Greenland's glaciers.

Mar 17, 2017, 1:22 PM



Oceans Melting Greenland is measuring the amount of ice loss around Greenland from a modified NASA G-III plane, but views from the ground are important too.

You can see Wolfsteinholme Fjord, just north of Thule AFB, is one of the few places in the world where multiple glaciers flow into the same fjord.

Mar 16, 2017, 5:28 PM

Click for Video

Place: Greenland (72, -40)

A time lapse video of the terrain from one of the recent flights over Greenland. Thanks to Ron Muellerschoen for the video.

Mar 14, 2017, 10:34 PM

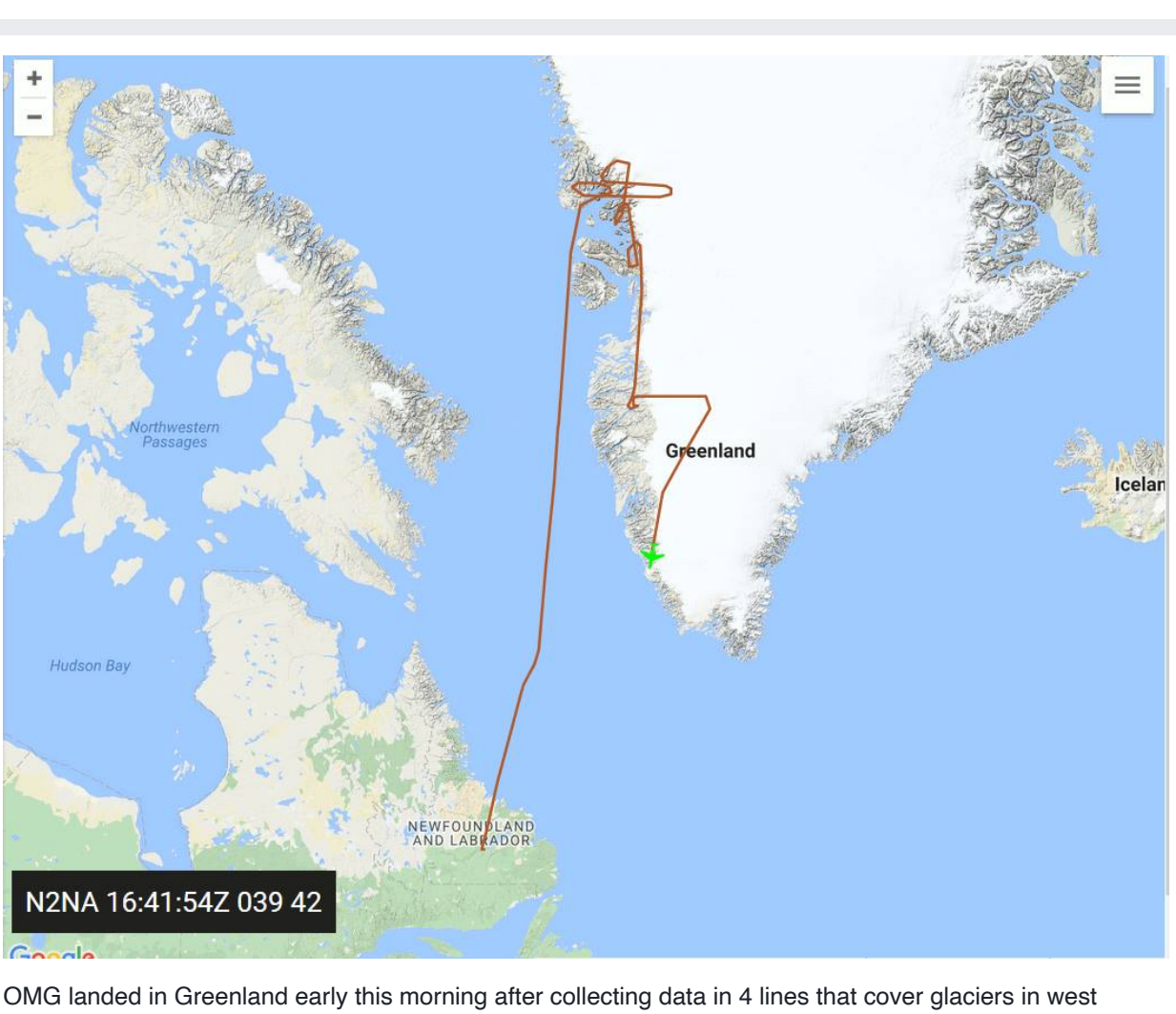
Long day for the OMG flight crew today. Flying out of Goose Bay, Canada, the plane collected data in West Greenland, before landing, refueling, collecting more data and landing in Keflavik, Iceland. The zig-zags in the flight path here shows where the plane was measuring the ice using the GLISTIN radar.

Place: Keflavík (64.002285294314, -22.567157319269)
Address: Keflavík

Mar 11, 2017, 2:45 PM

Picture of the day from west Greenland. Taken by Ron Muellerschoen.

Mar 11, 2017, 8:58 AM



OMG landed in Greenland early this morning after collecting data in 4 lines that cover glaciers in west Greenland.

Mar 11, 2017, 8:55 AM

We're back!!! OMG is back in the field beginning our second survey of the glaciers in Greenland. The orange lines on this map shows where we plan to survey and the small inset shows the crew in front of the G-III before they left Houston. Look for more updates this month.

Mar 10, 2017, 3:12 PM

It was VERY rainy yesterday in Houston, but the plane took off to Fargo, ND, where the crew will spend one night before heading to Greenland. Thanks Ron!

Mar 6, 2017, 10:47 AM

We're back!
Today, OMG begins its second survey of the ice in Greenland using the GLISTIN-A Radar. Sadly, I won't be joining the crew in the field this trip. Look for more posts from the field over the next few weeks, from me, Ron and Laura Faye Tenenbaum, who will be joining the crew in Thule in a couple of weeks!

Mar 6, 2017, 10:46 AM